

**AMENDMENTS TO THE DRAWINGS**

The attached drawing sheet includes new FIG. 1a. New FIG. 1a is based off previously submitted FIG. 1a, but includes an alternative embodiment heat exchanger having two heat-conducting elements.

Attachments: New Drawing Sheet

### REMARKS

Claims 9, 15-17 were pending in this application. Independent claim 9 has been amended to clarify the positional relationship among the various components. Specifically, the claimed positional relationship is conducive to providing favorable heat transference even under stress conditions (i.e., when the collector is fixed within a plumbing structure on one side (with the inner pipe fluid system) and at a frame structure at the other side (with the vacuum tube)). Claim 18 has been added to require that the at least one heat-conducting element is hard-soldered at the outer wall of the fluid-conducting pipe system. No claims have been cancelled. No new subject matter is believed to have been added by these amendments. Therefore, claims 9 and 15-18 remain in this application.

#### Drawing Objections

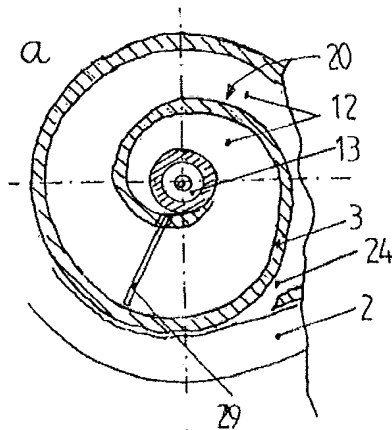
The Examiner objects to the drawing because the two spiral-shaped heat-conducting baffles of claim 15 are not disclosed. Applicant hereby submits new FIG. 1a that discloses an alternative embodiment heat exchanger having two heat-conducting elements. Reconsideration of the drawing objections is respectfully requested.

#### 35 U.S.C. §103 Rejections

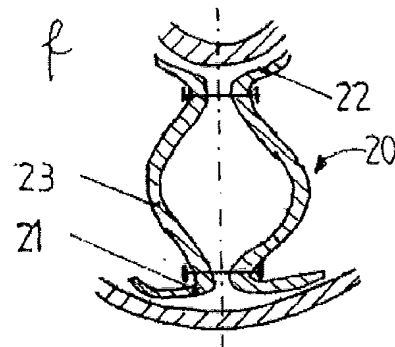
Claims 9 and 15-17 stand rejected under 35 U.S.C. § 103(a) for obviousness over DE 198 59 658 to Helmut et al in view of U.S. Patent No. 4,440,156 to Takeuchi et al, and further in view of U.S. Patent No. 6,619,283 to Ghela.

In order to understand the Helmut reference (as this is a German language patent reference) in the context of the obviousness rejection, Applicant hereby provides a summary of the relevant portions from the Helmut reference. With reference to FIG. 2a of Helmut, there is a heat conducting element 3 made of metal connecting the inner wall of the vacuum tube 2 to the inner tube 13. The means for collecting and concentrating solar energy is indicated to be an “absorber” 3. Column 3, line 63 of the original German Helmut reference specifies this absorber to be made of blackened copper-containing material. The absorber 3 is positioned within the so-called “Sorbensraum 12” (adsorption area), a place comprising water saturated air (*See* column 4, lines 36 to 40). The heat-conducting elements

are described as assuming various shapes (*See* column 3, lines 46 to 51). With respect to FIG. 2f, the webs (in German, “Stege”) 23 are resiliently (in German, “federnd”) positioned in an adapted manner at the inner wall of the vacuum tube (*See* column 3, lines 51 to 53). FIG. 2a shows a spiral heat-conducting element 3 almost covering 720 degrees.



**FIG. 2a**



**FIG. 2f**

The Examiner asserts that Helmut discloses a heat-conducting element that is contacting the outer wall of the fluid-conducting pipe system and is pre-stressed against the inner wall of the vacuum tube and the fluid-conducting pipe system (based on the word “resilient” on page 2, paragraph 5 of the machine language translation of Helmut). Applicants respectfully disagree. Helmut discloses in column 4, lines 3 to 7, that especially for spiral arrangements (“besonders innerhalb spiralförmiger Anordnungen”) it is preferable (“zweckmässig”) to provide elements 29 as spacers (“Abstandhalter”) to provide a diametral connection towards the pipe system 13 (“dass eine diametrale Verbindung zur Wärmeträgerführung zustande kommt”). It is impossible to have rigid spacer elements 29 and resilient heat-conducting elements 23 exerting such a spring-like function in the spiral shape embodiment shown in FIG. 2a. Although it is mentioned in column 3, lines 40 to 43 that such functionality would be realized (assumingly, in the context of the non-spiral embodiment of FIG. 2f), the presence of the spacer elements 29 in the spiral embodiment of FIG. 2a clearly shows that the distance is maintained through the spacer elements 29 and not by any prestress force. Therefore, Helmut fails to disclose the “prestressed” limitation.

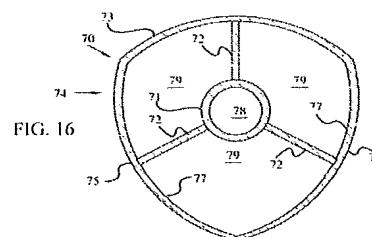
Additionally, Applicant respectfully disagrees with the Examiner that it would have been obvious to combine the teachings of Takeuchi relating to means for collecting and concentrating solar energy within the vacuum tube and the fact that the fluid conducting pipe system is a metal wall with the teachings of Helmut for the purpose of maximizing thermal output.

Helmut uses a thermal carrier (“Wärmeträgerführung”) in the adsorption area 12 containing the means for collecting and concentrating solar energy 23 and states that it is important that the solar energy is stored within the fluid in the area 12 (*See* column 4, lines 56 to 62) allowing for a storage of this energy over a day-night cycle. This fluid in area 12 is an additional fluid to the pipe system fluid (*See* column 4, lines 52 to 55). It is mentioned in Helmut that the accumulation of energy within the area 12 is possible due to the presence of the absorber 3 or the webs 23 in this area 12. Takeuchi uses a bent, non-concentric fluid pipe system 4 and support blades 7 and 8 to have a good thermal contact between these elements and the glass tube -- the absorber foil is on the other side of the glass tube.

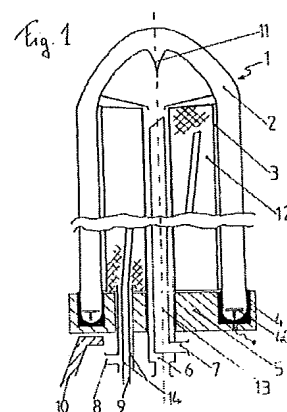
It has been held that the references used to attempt to obviate a claim must suggest the desirability and thus the obviousness of making the combination (*Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986)). There is no motivation for someone skilled in the art to move the absorber 3 from this area in the vacuum tube, because the presence of the absorber 3 in the adsorption room 12 is already optimized. Additionally, someone of ordinary skill in the art would not be able to easily combine the teachings of Helmut with those of Takeuchi because Takeuchi does not have concentric tubes. A creative approach of moving the absorber out of the adsorption area will not improve the resultant device. Therefore, there would be no desirability by one having ordinary skill in the art to use the absorber of Takeuchi in the Helmut heat exchanger.

Furthermore, Applicant respectfully disagrees with the Examiner that it would have been obvious to combine the teachings of Ghela relating to a heat conducting element being attached at the outer wall of the fluid-conducting pipe system with the teachings of Helmut and Takeuchi.

Ghela shows the heat-conducting element attached at the outer wall of the fluid pipe system (See column 11; FIGS. 15 and 16). Supports 72 in Ghela are called absorbing supports. However, the disclosure of FIG. 16, as read by someone skilled in the art is different than interpreted by the Examiner. Specifically, FIG. 16 depicts an integrated embodiment, wherein a wall 71 is a metal or PVC conduit; surface 73 is transparent, whereas walls 75, 76 with surface 77 are not; surface 77 is a reflecting surface (See column 11, line 20); webs 72 are the absorbing portions (as in other embodiments of the Ghela webs 10); volumes 79 are evacuated; and the webs 72 are attached at the integrated inner tube 71 for transfer of energy to the fluid 78.



Someone of ordinary skill in the art, reviewing Helmut and Ghela, may come to the realization that an attachment of the structure having the absorber to the fluid system could improve the heat transfer to the inner fluid system. However, there is no motivation for the combination of the teachings of Helmut and Ghela to use the isolated feature from the teaching of Takeuchi *to move the absorber out of the adsorption area* (element 12, in Helmut; vacuum volume 79 in Ghela) *into an exterior vacuum tube* (which is only available in Helmut, as Ghela has an integrated tube; this is an additional difference). This combination clearly diminishes, in an isolated view, the efficiency of the heat transfer itself, because the vacuum tube is an additional glass tube and there is no direct (attached) heat transfer possible. Additionally, attaching the spiral structure shape of FIG. 2a of Helmut at the central fluid system will not have the intended centering effect because it is the cover 4 from FIG. 1 of Helmut that holds the vacuum tube 2 and the fluid system 6, 7 in place. In other words, there are too many modifications that would need to be made from the existing features in Helmut, notwithstanding combining the features from the Helmut, Takeuchi, and Ghela documents to achieve the claimed invention.

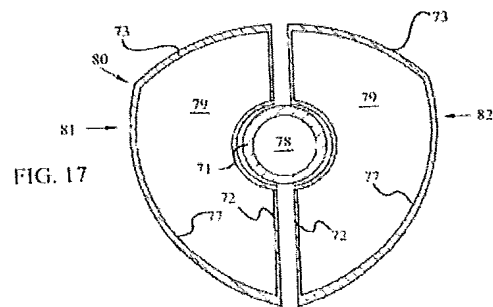


Applicant therefore respectfully submits that the Examiner's obviousness rejection is based on hindsight reconstruction. In *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992) the Court stated "[i]t is impermissible to use the

claimed invention as an instructional manual or ‘template’ to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that ‘[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.’” Moreover, in *Texas Instruments Inc. v. U.S. Intern. Trade Com’n.*, 988 F.2d 1165, 1178, 26 USPQ2d 1018, 1029 (Fed. Cir. 1993), the Court stated the prior art “references in combination do not suggest the invention as a whole claimed in the ...patent. Absent such suggestion to combine the references, respondents can do no more than piece the invention together using the patented invention as a template. Such hindsight reconstruction is impermissible.”

Furthermore, if the teachings of Ghela are used in combination with those of Helmut (and/or Takeuchi), the teaching of FIG. 17 must be used, because only FIG. 17 of Ghela uses a specific conduit similar to that of Helmut and Takeuchi, instead of an integrated solution that is depicted in FIGS. 15 and 16 of Ghela -- such a specific pipe

facilitates connecting with plumbing fixtures (*See* column 11, lines 51 to 59). Column 12, lines 20 to 38, describing FIG. 17, indicates a metal pipe, however, the heat-conducting elements only “fit snugly” (*See* column 12, line 32) into the volume. Ghela does not mention an attachment to a separate inner fluid tube and no prestress aspect. This is understandable, as the attachment is only used if the inner pipe element, at which the web 72 (being the absorber element) is attached, is part of vacuum volume 79 and not a different fluid pipe system.



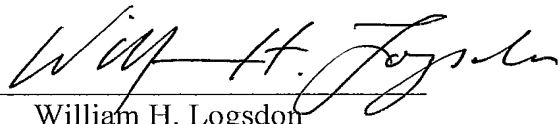
For the foregoing reasons, Applicant believes that the subject matter of amended independent claim 9 is not rendered obvious by Helmut in view of Takeuchi and further in view of Ghela. Reconsideration of the rejections of claim 9 is respectfully requested. Claims 15-18 depend from and add further limitations to amended independent claim 9 and are believed to be patentable for the reasons discussed hereinabove in connection with amended independent claim 9.

**CONCLUSION**

Based on the foregoing amendments and remarks, reconsideration of the rejections and allowance of pending claims 9 and 15-18 are respectfully requested.

Respectfully submitted,

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